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EAP WORKSHOPS... EAP WORKSHOPS... EAP WORKSHOPS... EAP WORKSHOPS

Attention dam owners and dam professionals!

In April 2003, the State Engineer adopted regulations for the administration of the safety of dams program. In addition to codifying long standing policy for the permitting, operation and inspection of dams, a provision requiring certain dams to have an emergency action plan (EAP) was included.

The deadline for submitting an EAP is fast approaching for owners of **significant hazard** dams. This deadline is March 31, 2007. Owners of **high hazard** dams must have EAPs in place as of March 31, 2005. If you do not know the current hazard classification of your dam, please call Michael Anderson or Robert Martinez at (775) 684-2800. If you have internet capability, the State Engineer's website may be reached at http://water.nv.gov .

The State Engineer is offering another Owner's Workshop on EAP Development to be held on October 17, 2006, at our office: **Bryan Building, 901 S. Stewart St., Second Floor, Carson City, Nevada.** This workshop will be identical in content to the previous workshops.

In addition, a ***new*** Workshop on EAP Exercises is being offered at the same venue! This workshop will be held on November 16, 2006.

Please mark your calendars for **Tuesday, October 17, 2006,** (EAP Development) and/or **Thursday, November 16, 2006,** (EAP Exercises) and plan to attend these informative workshops. RSVP no later than October 15, 2005, to Michael Anderson at (775) 684-2843, the address on this letterhead, or manderson@water.nv.gov . If you choose to e-mail your RSVP, please use "EAP Workshop" in the subject line.

The Workshop on EAP Development will cover the need for, format and content of a typical EAP from 8:30 AM to 4:30 PM with a one-hour lunch break. The Workshop on EAP Development will **not** cover the technical details of creating some of the components that make up an EAP such as developing an inundation map, recognizing emergency conditions or internal emergency procedures.

The Workshop on EAP Exercises will cover the need for, types and objectives of effective exercises. Exercises must be held on a periodic basis to keep the EAP current.

We look forward to seeing you on October 17th and/or November 16th!

Michael J. Anderson, P.E.
Staff Engineer III

MJA/sg

Owner responsibilities - Emergency Action Plan

When is an Emergency Action Plan required?
Nevada Administrative Code (NAC) 535.320 states that an Emergency Action Plan (EAP) must be submitted for all high hazard dams on or before March 31, 2005 and for all significant hazard dams on or before March 31, 2007.

Dam plans approved (permitted) by the State Engineer must have an EAP on file pursuant to NAC 535.320 in order to receive an approval to impound pursuant to NAC 535.300. Only high hazard (approval on or after May 30, 2003) and significant hazard (approval on or after March 31, 2005) dams must meet this requirement.

Although an EAP is not currently required for dams classified as low hazard, it is strongly advised that an EAP should be developed. The hazard environment for dams is constantly changing. It may take only one house built near a dam to alter its hazard classification to high from low. Should that occur, the necessity for an EAP becomes mandatory.

What is an "EAP?"
An Emergency Action Plan (EAP) is a document prepared in advance of an emergency that guides the dam owner or operator through pre-planned responses to emergencies at their dam.

The primary function of the EAP is to allow for advance notification to affected parties of an emergency at a dam. Notification is made to local emergency response personnel and, in some instances, directly to affected property owners and residents in the danger zone.

An important secondary function of the EAP is to establish lines of communication between the dam owner/operator, emergency responders and affected populations.

Another important secondary function of the EAP is to provide a single resource for on-site response to potential emergency conditions before they can develop into a full-blown emergency.

Most importantly, it must be borne in mind that the EAP is a document that will be referenced in an emergency! The nature of an emergency promotes panic and limits a person's ability to logically deduce actions or locate resources. The EAP is most useful when it is organized in such a manner as to promote simple identification of an emergency condition, suggests appropriate responses and guides the user to the next identification or response step.

What is involved in developing an EAP?
NAC 535.320(3) states that EAPs must:

1) Be prepared under the direction of a professional engineer;
2) Conform to the format specified by the State Engineer;
3) Include a detailed response for each foreseeable emergency; and
4) Include one or more inundation maps.

1) A draft EAP may be prepared by the owner or owner's agent without the benefit of an engineer's stamp. The absolute minimum "stamped" content for final submittal to the State Engineer is the inundation map and the calculations/model output used in its preparation. The body of the EAP may be prepared by the owner or owner's agent and need not bear the stamp of a professional engineer (P.E.). On the other hand, preparation under the direction of a single entity will reduce misinterpretation of data, maps, content or format.

2) The State Engineer specified format is "clear and understandable." The preferred format is that proposed by the Federal Emergency Management Administration (FEMA). An outline and explanation can be found in the publication "FEMA 64" and may be viewed at the FEMA website: http://www.fema.gov/fima/damsafe/eap_iib.shtm . Other formats (Corps of Engineers, Federal Energy Regulatory Commission, Bureau of Reclamation, custom, etc.) are acceptable so long as they pass the "clear and understandable" test as performed by the State Engineer and have the minimum regulatory content.
The FEMA EAP format has six (6) distinct elements:

1) Notification; Timely and appropriate notification of an emergency is critical to effective implementation of an EAP.
2) Detection, evaluation and classification; Emergencies must be timely and reliably recognized and appraised so that appropriate action may be taken and effective communication can be held with emergency responders.
3) Responsibilities; Each party's responsibilities in the event of an emergency must be clearly specified and understood by everyone involved, site and situation specific and ensure timely effective action.
4) Preparedness; Materials, equipment and personnel must be located and a means developed for their acquisition and use during an emergency. Steps to be taken to moderate or alleviate the effects of an emergency must be listed.
5) Mapping; Delineation of flooded areas in the event of a dam failure or unusually high discharge.
6) Documentation; Information used in the development of the EAP.

3) Considerable experience with the dam or with dams in general will be required to develop a list of all foreseeable circumstances in which a failure may result. In addition to potential failure scenarios, a list of non-failure scenarios may need to be developed if they can lead to either significant damage beyond the dam and reservoir or to loss of life. A typical non-failure scenario that must be addressed is high spillway flow. Although the dam may be responding to a flood by passing the excess water through the spillway, the amount of flow may be sufficient to overwhelm the downstream channel and cause flooding.
Small initiating conditions, such as a new seep, should also be detailed, as it is common for a dam failure to be preceded by such an apparently insignificant event. As an emergency condition progresses, either to a larger emergency or back to a lesser emergency, specific actions should be delineated to address the greater or lesser level of "alert."

4) Inundation maps are the primary tool used in the determination of a population at risk from a dam emergency, prioritization of notification and choosing escape routes. Subsequently, an accurate inundation map is critical to the proper function of an EAP. Should the inundation map

be inaccurate, time may be wasted notifying people that are not in any danger. Conversely, people that need timely notification may never be reached with tragic consequences.
Proper inundation map preparation requires the skills of an engineer familiar with hydraulic modeling and mapping. A functional EAP will have an inundation map for every major failure mode (if applicable) from "clear sky" failure (dam breach without an antecedent flood) to high spillway flow to overtopping from a large flood. Some potential conditions will include elements of each. On the other hand, some dams are designed or situated in such a position that only one or two failure modes need to be mapped. The expertise of an engineer is helpful in determining the level of effort necessary to properly map the potential emergency conditions.
The inundation map will, in addition to inundated areas, show the time it takes for the first water to reach certain points downstream, time to the peak of the flood and the peak flood depth. Some maps may also include an estimate of water velocity at the flood peak.

Once an EAP has been drafted, it is important to coordinate with local emergency responders and your local emergency management coordinator. If there is no emergency management coordinator in your area, contact the Nevada Division of Emergency Management (DEM) for direction. In some instances, it will be necessary to coordinate with emergency personnel from many different jurisdictions, either at different levels of local government or with multiple governments (such as neighboring cities, counties or states). All affected entities must be contacted and as many as possible included in the planning process. All affected entities must be given a copy of the final EAP and any updates.

Submitted EAPs or drafts are reviewed by the State Engineer for accuracy, completeness, usefulness, and conformance with the regulations. Comments and suggested or required alterations are returned to the owner for incorporation into the final EAP. A list of parties to which a copy of the EAP has been presented must also be present in the document.

I have an EAP, is there anything else I must do?
An EAP is a "living document." In other words, the environment in which the dam lies is not static. Phone numbers are altered, development occurs, jurisdictions change and people move or responsibilities change. For these reasons, NAC 535.320(4) requires that EAPs be periodically exercised and updated.

Exercising an EAP can be as simple as calling all the numbers to verify their applicability and range up to a "full scale" exercise in which all of the involved parties respond to a simulated emergency as if it were real. Important lessons in communication and responsibility are learned in the course of an exercise.

Updating the EAP has the same range of effort involved. From updating contact names and phone numbers to effectively rewriting the entire document in the event of major changes to the downstream hazard area, dam and reservoir or emergency response jurisdictions. Updated EAP pages, sections or entire documents must be periodically sent to all the parties that originally received the EAP so that everyone is able to look at the same "playbook."